PATENT
Docket No. 146712000400

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N. DeRiggi

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In the application of:

Qixu (David) CHEN et al.

Serial No.: 09/559,347

Filing Date: April 27, 2000

For: MEDIUM WITH NiNb SEALING LAYER

Examiner: Kevin M. Bernatz

Group Art Unit: 1773

APPELLANT'S OPENING BRIEF (REVISED)

Commissioner for Patents
Washington, D.C. 20231

Sir:

This is a timely appeal from the final rejection of claims 2, 3, 8, 9, 11, 12, 17, 18 and 21-25 of this application.

I. REAL PARTY IN INTEREST

The real party in interest is Seagate Technology Holdings (formerly Seagate Technology LLC).

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences within the meaning of 37 CFR 1.192(c)(2) known to appellant or counsel.

III. STATUS OF CLAIMS

Claims 2, 3, 8, 9, 11, 12, 17, 18 and 21-25 (shown in Appendix 1), which are under final rejection, are the only pending claims in the application.

(a) Claim Rejections - 35 USC 103: (1) Claims 2, 11, 18 and 21-23 were rejected as being obvious over Ross (U.S. Pat. No. 5,980,997) and Starcke (U.S. Pat. No. 6,183,828) in view of Taguchi (U.S. Pat. No. 5,874,376). (2) Claims 3 and 12 were rejected as being obvious over Ross, Starcke and Taguchi in view of Chen (U.S. Pat. No. 5,733,370). (3) Claims 8 and 17 were rejected as being obvious over Ross, Starcke and Taghuchi in view of Okamura (U.S. Pat. No. 5,480,733).[1] (4) Claims 9 and 18 were rejected as being obvious over Ross, Starcke and Taguchi, and allegedly "in view of applicants' admissions."[2] (5) Claims 24 and 25 were rejected as being obvious over Ross in view of Starcke and further allegedly "in view of applicants' admissions."

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[1] See paragraph 12, Action of March 14, 2002, though paragraph 8, Action of June 12, 2002, incorrectly refers to claims 8 and 17 as "3 and 12."

[2] See paragraph 13, Action of March 14, 2002, which refers to claims 9 and 18 as "9 and 19." Claim 19 had been canceled prior to the Action of March 14, 2002, and the language of method claim 18 generally corresponds to device claim 9. Therefore, Applicants are assuming that the Examiner meant "9 and 18" instead of "9 and 19" in paragraph 13, Action of March 14, 2002. In paragraph 9, Action of June 12, 2002, then incorrectly refers to claims 9 and 18 as "3 and 12."

(b) Claim Rejections - Claims 2, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18 and 21-25 were rejected for obviousness-type double patenting over claims 1-20 of Chen '890 (U.S. Pat. No. 6,120,890) in view of Ross.

IV. STATUS OF AMENDMENTS

All amendments (except the Amendment of September 12, 2002) and declarations presented in prosecution have been entered.

V. SUMMARY OF THE INVENTION[3]

The invention of this application is generally directed to a magnetic medium, such as a disc in a hard-drive of a computer, and the method of manufacturing the medium. [1:7-8][4]

The present invention enables the manufacture of magnetic recording media exhibiting low Li migration and suitable for high density longitudinal and perpendicular magnetic recording employing a glass or glass-ceramic substrate having high Li_2O concentrations, e.g., about 0.5 to about 32 wt.%, preferably about 5 to about 15 wt.%, most preferably about 8 to 11 wt.%. Li_2O in glass or glass-ceramic substrates advantageously reduce the glass transition temperature. As a result, the utility of such recording media is expanded to extreme environments, including high temperature humidity environments. This objective is achieved by strategically forming a sealing layer on the glass or glass-ceramic substrate containing the high Li concentration or by

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[3] The original specification did not include line numbers. Therefore, a substitute specification including line numbers is enclosed herewith. The page and line numbers in the Summary of the Invention are those of the Substitute Specification.

[4] The reference "1:7-8" means "page 1, lines 7 and 8." The reference to page and line numbers is provided at the end of the subsequent paragraphs in the Summary of the Invention.

forming a sealing means for substantially preventing the migration of Li from the substrate. [10:14-11:2]

A sealing layer or the sealing means prevents leaching of Li from the substrates. The sealing layer or the sealing means can function as a seed layer when the layer affects the magnetic properties of the media. A sealing layer or a sealing means is a layer that can reduce Li concentration on the surface of the magnetic media to less than 500 counts/minute by the time-of-flight secondary ion mass spectroscopy (TOF-SIMS) method as follows. After the disc media are sputter-deposited, about 15Å of lubricant was applied onto the surfaces of the discs. The discs were sent into a chamber in the environment of 60°C and 80% relative humidity (RH) for 4 days, then were analyzed with TOF-SIMS. The surface concentration of lithium is used as disc corrosion criteria and is expressed in μg/disc or counts/minute. [11:3-12]

Embodiments of the substrate comprising Li is a glass or glass-ceramic substrate. Embodiments of the sealing layer and the sealing means include sputter deposited NiNb, preferably amorphous NiNb, layer on the glass or glass-ceramic substrate. The sputter deposited NiNb layer prevents Li migration from the glass or glass-ceramic substrate. [11:13-16]

The exact mechanism underpinning sealing of Li to the substrate employing an amorphous layer is not known with certainty. However, it is believed that Li migration is substantially prevented by denying Li ions access to grain boundaries, which are high diffusion paths. An amorphous layer and a single-crystal type layer are substantially devoid of grain boundaries and, hence, could provide effective sealing of Li from the substrate. While an amorphous NiNb layer is the preferred embodiment, any NiNb layer that could substantially prevent the migration of Li from the substrate could be employed in this invention. [11:17-12:2]

Advantageously, the present invention enables the manufacture of magnetic recording media on glass or glass ceramic substrate with a large amount of Li which causes a reduced glass transition temperature, and enables the use of such magnetic recording media under extreme environmental conditions, including high temperature and high humidity. [13:7-11]

An embodiment of the present invention is schematically illustrated in Fig. 2 and comprises a glass or glass-ceramic substrate 20 containing about 10.5 wt.% Li_2O. Sequentially deposited on each side of substrate 20 are amorphous NiNb sealing layer 21, 21', underlayer 22, 22', magnetic layer 23, 23' and protective overcoat 24, 24'. [14:18-21]

Advantageously, the present invention can be conducted by sputter depositing the amorphous sealing layer, underlayer, magnetic layer and protective overcoat in an in-line pass-by apparatus comprising a plurality of sequentially spaced sputtering chambers. [15:10-13]

During the course of the present invention, Applicants first deposited an amorphous NiP seed-layer on a Li-containing substrate to prevent Li migration. Applicants found that amorphous NiP seed layer is easily changes its structure from amorphous to crystalline and destroys tribological and magnetic performances of magnetic recording medium because it loses its ability to prevent Li migration through the NiP seed layer. Applicants also found that the adhesion between NiP film and glass substrates was poor. [7:13-15]

Therefore, there existed a need for technology enabling the use of glass and glass-ceramic substrates containing Li in magnetic recording media while preventing Li migration from the substrate. [7:8-10]

Applicants, unexpectedly found that even a thin sealing layer of a thickness of about 450Å or less comprising substantially amorphous NiNb directly deposited on the Li-containing glass or glass-ceramic substrate and substantially prevents migration of Li from the substrate to

the magnetic layer of the magnetic recording medium. [See Table 1, 16:1-3.] In particular, Table I shows that 200Å of NiNb films are sufficient to reduce lithium migration to an acceptable level. [16:9-10]

VI. ISSUES PRESENTED FOR REVIEW

(1) Whether the Examiner erred in rejecting claims 2, 11, 18 and 21-23 as being obvious over Ross and Starcke in view of Taguchi.

(2) Whether the Examiner erred in rejecting claims 3 and 12 as being obvious over Ross, Starcke and Taguchi in view of Chen.

(3) Whether the Examiner erred in rejecting claims 8 and 17 as being obvious over Ross, Starcke and Taghuchi in view of Okamura.

(4) Whether the Examiner erred in rejecting claims 9 and 18 were rejected as being obvious over Ross, Starcke and Taguchi, and allegedly "in view of applicants' admissions."

(5) Whether the Examiner erred in rejecting claims 24 and 25 as being obvious over Ross in view of Starcke and further allegedly "in view of applicants' admissions."

(6) Whether the Examiner erred in rejecting claims 2, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18 and 21-25 for obviousness-type double patenting over claims 1-20 of Chen '890 in view of Ross.

VII. GROUPING OF CLAIMS

Group I: Claims 2, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18 and 21-25 stand or fall together.

VIII. ARGUMENTS

A. The Rejections of the Claims Over the Prior Art Should be Reversed.

Independent claims 21-23 and dependent claims 2, 11 and 18 were rejected as being obvious over "Ross et al. ('997) and Starcke et al. ('828) in view of Taguchi et al. ('374)." See paragraphs 6 and 10, Actions of June 12, 2002, and March 12, 2002, respectively. The 35 USC 103 rejections of claims 3, 5, 6, 8, 9, 12, 14, 15 and 17 apply additional references besides Ross, Starcke and Taguchi. In making the obviousness rejection of claims 24 and 25, the Examiner combines Ross and Starcke with the disclosure on page 6, lines 1-5, of the specification.

The Examiner relied on Ross for teaching an embodiment wherein "NiNb is sputtered directly onto the substrate 112." See column 8, lines 1 and 2 of Ross. Ross teaches that the NiNb layer should be laser textured, which the Examiner recognizes and states the following on page 6, lines 1-3 from the bottom, Action of June 12, 2002: "The examiner deems that evidence indicating that laser textured NiNb would not inherently prevent the migration of Li ions would be sufficient to overcome the rejections of record."

It is not clear from the Actions of June 12, 2002, and March 12, 2002, as to how Starcke supplements Ross or Taguchi. It appears that Starcke is a cumulative reference over Ross. The following statements of the Examiner wherein Starcke is cited further support this assertion:

> [I]t is known that NiP and NiNb sealing layers prevent the migration of alkali (e.g. Li) ions.[5] [See Action of March 12, 2002, page 8, lines 5-8; citing Ross and Starcke.]
>
> Ross et al. ('997) and Starcke et al. fail to disclose using a glass substrate comprising Li. [See Action of March 12, 2002, page 8, lines 10 and 11.]

As is evident from the above statements, the Examiner cites Starcke in conjunction with Ross for substantially the same teaching. The Examiner cited Taguchi for disclosing a Li-containing substrate.

1. The Examiner has Incorrectly Read the Prior Art Based on Hindsight Gained from this Invention and Failed to Recognize that Applicants have Solved a Problem that was NOT even Recognized as a Problem in the Prior Art.

As stated above, the Examiner states, "it is known that NiP and NiNb sealing layers prevent the migration of alkali (e.g. Li) ions." [See Action of March 12, 2002, page 8, lines 5-8; citing Ross and Starcke.] This is an incorrect statement. Nowhere does either Ross or Starcke state that NiNb sealing layer prevents migration of Li ions. In column 3, lines 12-18, Ross states the following:

> Fourth, glass used to manufacture magnetic disks typically has corrosive constituents such as Na. The Na can diffuse out of the substrate and promote corrosion of the magnetic layer. During a process in accordance with my invention, the glass substrate is essentially encapsulated by NiP, and Na and other impurities cannot reach and corrode the magnetic layer.

In column 2, lines 46-52, of Starcke, which is cited by the Examiner, Starcke states:

> [M]ost glasses have alkaline metal ions present in their composition which may cause a corrosive effect known as salt bloom. This chemical phenomenon may additionally contribute to disk malfunction. Even after sputtering a magnetic layer, and wear layer, *the glass is not completely sealed and corrosion problems may occur*. [Emphasis added.]

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[5] This statement is incorrect as explained below.

In short, nowhere does Ross and Starcke support what the Examiner alleged on page 8, lines 5-8, Action March 12, 2002.

When the Applicants raised this issue in the Amendment of April 5, 2002, the Examiner cited column 3, line 67 to column 4, line 2, of Starcke,[6] and responded on page 6, lines 1-3, Action of June 12, 2002, as follows:

> Ross et al. teach that NiNb and NiP prevent the migration of Na ions while Starcke et al. teach that a well adhered NiP layer prevents the migration of ***all*** alkali ions[.] [Italics and bold in original.]

Again the Examiner misinterpreted Ross and Starcke. Nowhere does Ross state that NiNb prevents the migration of Na. Furthermore, even if a person ordinary skill would have known that NiNb prevents the migration of Na, that would *not* have made a person of ordinary skill recognize that NiNb could also prevent the migration of Li for the following reasons.

First, Na has an atomic number of 11 while Li has an atomic number of 3. Therefore, Na is a much larger atom than Li. Therefore, what could work as an encapsulating layer to prevent migration of Na would not necessarily work as an encapsulating layer for Li. This is analogous to the situation where a filter that traps large particles will not necessarily trap small particles. On the other hand, if persons of ordinary skill in this art would have known that a material prevents migration of Li, then one could arguably say that the same material will likely prevent the migration of Na, which is not the case here.

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[6] "The nickel phosphorous plating of glass substrate eliminates problems of corrosion as it encapsulates all the alkaline metal ions which may leach out."

Second, and more importantly, Professor Caroline Ross of MIT, who is the inventor of the Ross reference cited by the Examiner states the following in paragraph 9 of the Ross Declaration of August 21, 2002 (filed with the Amendment of September 12, 2002):

> Ross and the Applicants' disclosure describe two very different technological advances. In Ross, NiNb is chosen because of its convenience as a laser texture layer and because it forms bumps with suitable and well-controlled shapes when irradiated with a laser. Its diffusion barrier properties are not considered or discussed and, therefore, would not have been obvious to a person of ordinary skill based on the disclosure of Ross. In the Applicants' disclosure, NiNb acts as a diffusion barrier for preventing Li migration from a Li-containing substrate. Even today, it is not obvious that a material that responds well to laser texturing should also be a good diffusion barrier, much less would it have been obvious at the time of the claimed invention. Moreover, the process of laser texturing, in which the NiNb layer is exposed to a laser beam, may adversely affect the diffusion barrier properties of the layer. I have observed, from experiments on films of various materials, that laser irradiation can burn through, crack or otherwise weaken the film. Such damage would severely degrade the ability of the film to prevent the diffusion of Li, and it is particularly likely to occur in thinner films such as those described in the pending application. *In particular, it is not necessary that a NiNb film of 450Å (45 nm) or less, or indeed of any material in this thickness range, subjected to laser texturing, would prevent diffusion of Li, due to the unknown relationship between diffusion-barrier properties and bump formation in materials, and the unpredictable effects of laser texturing on the diffusion-barrier properties of thin films. Thus the diffusion-barrier property of NiNb layer would not have been recognized by a person of ordinary skill* who would have combined the teachings of Ross and Taguchi and thereby sputtered NiNb directly onto a Li-containing substrate. Without even recognizing that a NiNb layer sputtered directly on a Li-containing substrate could prevent Li migration, I fail to understand how a person of ordinary skill could have arrived at this invention by combining the teachings of Ross and Taguchi. [Emphasis added.]

It is rather surprising that even though Professor Ross of MIT, the author of the Ross reference and an expert in the field of this invention, states that "*the diffusion-barrier property of*

NiNb layer would not have been recognized by a person of ordinary skill," the Examiner fails to accept Professor Ross' Declaration. Instead, the Examiner continues to make hypothetical statements as to what the Examiner believes persons of ordinary skill would have recognized in this art. "An affidavit submitted to overcome a rejection is intended to be relied upon. ... [A]rguing that an affidavit submitted to persuade was defective as presenting only opinion, not fact, and that it should be discounted, qualifies only for a chutzpah award, not a reversal." *Refac International, Ltd. v. Lotus Development Corporation*, 81 F.3d 1576; 38 USPQ2d 1665 (Fed. Cir. 1996); citations omitted. Applicants respectfully submit that Professor Ross' Declaration should be relied upon.

With respect to Starcke, the Examiner is generalizing Starcke by stating that it "teach[es] that a well adhered NiP layer prevents the migration of ***all*** alkali ions." In fact, the Applicants recognized the problems of a NiP seed layer in its ability to prevent the migration of Li ions and, therefore, states the following on page 7, starting at line 12, of the specification:

> During the course of the present invention, it was found that amorphous NiP seed layer is easy to transfer to crystalline structure and destroy tribological and magnetic performances of magnetic recording medium. The adhesion between NiP film and glass substrates is not good also. Therefore, applicants recognized that there is a need to find sealing layers, which enhance magnetic recording performances, reduce lithium migration, and have good adhesion on glass and glass-ceramic substrates.

Clearly, because NiP layer cannot prevent the migration of Li as found by the Applicants, the statement from Starcke relied upon by the Examiner is incorrect and rebutted by the Applicants own disclosure in this application. As the court stated in *In re Nomiya*, 509 F.2d 566, 571, 184 USPQ 607, 611-12 (CCPA 1975), "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem

is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention."

In short, there is no suggestion in the cited references that NiNb prevents migration of Li and the Examiner has *not* appreciated the fact that the Applicants are the first to recognize the problems of Li migration through NiP and provide a remedy to this problem by using a NiNb sealing layer. Any statements made by the Examiner to the effect that it was known in the prior art that NiNb prevents migration of Li are based on hindsight gained from this invention, not from the cited references.

2. The Examiner has Incorrectly Applied the Law on Functional Limitation and Inherency.

Independent claims 21 and 22 recite "wherein the sealing layer has a thickness of about 450Å or less and substantially prevents migration of Li from the substrate to the magnetic layer of the magnetic recording medium." Independent claim 23 recites "a sealing means comprising NiNb directly on the substrate having a thickness of about 450Å or less for substantially preventing migration of Li from the substrate to a magnetic layer of the magnetic recording medium."

With respect to the functional limitation, "the sealing layer ... substantially prevents migration of Li from the substrate," initially, in paragraph 8, Action of September 20, 2001, the Examiner took the following position:

> In the instant case, applicants' are merely reciting what the layer does, i.e., "prevents migration of Li from the substrate", and as such this limitation is given little or no weight in determining patentability since it is not further limiting in so far as the structure of the medium is concerned.

The Examiner's position that the functional limitation "is given little or no weight in determining patentability since it is not further limiting in so far as the structure of the medium is concerned" is clearly contrary to the law. "A patent applicant is free to recite features of an apparatus either structurally or functionally." *In re Schreiber*, 128 F.3d 1473, 1478; 44 USPQ2d 1429 (Fed. Cir. 1997). Furthermore, on the topic of "functional limitation," MPEP 2173.05(g) states:

> A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

Later, after possibly recognizing the fallacy in the Examiner's arguments of providing "little or no weight" to a function limitation, on page 7, line 10, to page 8, line 2, Action of March 14, 2002, the Examiner modified his position on the functional limitation:

> However, even assuming the above limitation is given patentable weight as a "functional" limitation, it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada,* 911 F.2d 705, 709,15 USPQ2d 1655, 1658 (Fed. Cir.

> 1990). Therefore, the *prime facie* case can be rebutted by ***evidence*** showing that the prior art products do not necessarily process [sic, possess] the characteristics of the claimed product. *In re Best*, 562 F.2d at 1255, 195 USPQ at 433. [Italics and bold in original.]

Applicants respectfully submit that the Examiner modified position is also contrary to the law.

Foremost, the Examiner has not even established "a *prima facie* case of either anticipation or obviousness" unlike alleged above. Furthermore, unlike *Spada*, there are *no* "products of ... the prior art" that necessarily possess the claimed characteristics alleged by the Examiner to be "inherent" in the prior art. Both these arguments are explained below.

Effectively, the Examiner's position is that he has established a *prima facie* of obviousness by showing that Ross discloses "NiNb is sputtered directly onto [a non lithium containing glass] substrate" (column 8, lines 1 and 2, of Ross) and Taguchi discloses a Li-containing glass substrate. So, according to the Examiner, a person of ordinary skill would have been motivated, of which Applicants disagree as stated on page 7, starting at first new paragraph to page 8, line 2, of the Amendment of April 5, 2002, to directly sputter NiNb on Taguchi's substrate, and this would result in the claimed functional characteristics as an "inherent" properties of a hypothetical device arrived upon by the combination of Ross and Taguchi.

While the Examiner logic appears to be quite appealing, there is an underlying flaw in this logic as explained by the Federal Circuit in *Elan Pharmaceutical, Inc. v. Mayo Foundation For Medical Education Research*, 304 F.3d 1221, 64 USPQ2d 1292 (Fed. Cir. 2002):

> The district court found that the Elan claims were anticipated by Mullan because use of the standard procedures set forth in Mullan would be expected to produce a statistically small percentage of transgenic mice, and some of these mice would be expected to produce detectable ATF-betaAPP on enzymatic

cleavage. The court deemed it irrelevant that the ATF-betaAPP was not described in the prior art. The court found that since the low success rate for gene transfer and expression was known, it was a matter of statistical probability that a few successful results would be obtained. Thus the district court found that the Elan invention was anticipated by Mullan.

...

Mayo does not dispute that the Mullan reference makes no mention of the formation of ATF-betaAPP in detectable amounts in brain homogenate. Mayo argues, and the district court found, that this claim limitation is "inherent" in Mullan because a successful transgenic procedure and ensuing enzymatic cleavage will produce ATF-betaAPP. However, this was not shown by Mullan, and there was no evidence that the formation and detection of ATF-betaAPP in the transgenic mouse brain with the Swedish mutation was known to persons of ordinary skill in the field of the invention. Inherency cannot be based on the knowledge of the inventor; facts asserted to be inherent in the prior art must be shown by evidence from the prior art. Cf. In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (criticizing the "hindsight syndrome wherein that which only the inventor taught is used against its teacher"). The purpose of the rule of inherency is to accommodate common knowledge, knowledge that judges might not know but that would be known to practitioners in the field. Finnigan Corp. v. Int'l Trade Comm'n, 180 F.3d 1354, 1365, 51 USPQ2d 1001, 1009 (Fed. Cir. 1999).

Id. 304 F.3d at 1228-29.

Judge Dyk states the following in his dissenting opinion in *Elan Pharmaceutical*:

The majority decision in this case rests upon the ground that an inventor's own disclosure may not be used under 35 U.S.C. § 102 as proof of anticipation by inherent disclosure in a prior art reference. This decision contradicts our own case law, which holds that knowledge of an inherent characteristic in the prior art is irrelevant. As we recently recognized in In re Cruciferous Sprout Litigation, No. 02-1031, slip op. at 12 (Fed. Cir. Aug. 21, 2002), on the issue of inherency "[i]t matters not that those of ordinary skill heretofore may not have recognized these inherent characteristics." Here, as in Cruciferous, while Elan "may have recognized something quite interesting about those [mice], it simply has not invented anything new." Id. at 13. This decision, if

followed, will have serious and unfortunate consequences in the future by permitting the securing of patent rights to existing inventions so long as the patent applicant identifies an inherent characteristic of that product that was not identified in the prior art.

Id. 304 F.3d at 1231.

In response to the dissenting opinion, the majority in *Elan Pharmaceutical* clarifies the law of inherency as follows:

> We respond to the remarks of our colleague in dissent, for he has inaccurately perceived the "ground" on which our decision "rests." The ground of our decision is, simply, that a novel patented product is not "anticipated" if it did not previously exist.
>
> The dissenter objects to what he calls the patenting of "existing inventions." We too object to the patenting of existing inventions. However, Elan is not patenting something that previously existed, for Elan's mouse did not exist. While Mullan surely had the concept of creating a transgenic mouse with the mutated Swedish gene, as we have illustrated ante, Mullan did not make such a mouse and he did not tell (or know) which, if any, of the standard procedures from the scientific literature might be effective in achieving the complex series of transformations needed for a successful product. A general proposal to make a product that has not been made does not meet the criteria of "anticipation." Indeed, Mayo affirms in its brief that no mice had been made by Mullan; Mayo also affirms, contrary to the statements of the dissent, that "Mayo admits that some of the mice made according to the recipe [in the Mullan patent] will not have detectable ATF." Mayo brief at 19.
>
> The dissent proposes that this decision will "have serious and unfortunate consequences in the future by permitting the securing of patent rights to existing inventions so long as the patent applicant identifies an inherent characteristic of that product that was not identified in the prior art," citing In re Cruciferous Sprout Litigation, 2002 U.S. App. LEXIS 17185 (Fed. Cir. 2002). We repeat, the Mullan mouse did not exist, quite unlike the broccoli sprouts of the Cruciferous Sprout Litigation, "long well known in nature and eaten by humans for decades." Id. 2002 U.S. App. LEXIS 17185.

> The dissenter appears to urge the unpatentability of any product that has been suggested but never made. This approach would eliminate even the possibility of patent protection for any transgenic product that may have been envisioned but not yet produced. A better rule is the established law, whereby *new products are not "anticipated" when they did not previously exist*, whether or not the process for making them is generally known. Although our colleague postulates "serious and unfortunate consequences in the future" if the Elan mouse is deemed patentable, others may believe that without the possibility of a patent on a new transgenic mouse, the hypothetical mouse envisioned by Mullan might well remain no more than a hypothesis. Determination of which consequence is fortunate or unfortunate is an important policy question; the law of anticipation as applied herein does not change existing policy.
>
> "Anticipation" in the patent sense means that the subject matter was previously known. A precatory suggestion of general procedures that may or may not succeed in producing the novel product, a product that has not previously been produced, does not convert the suggested product into a previously existing product.
>
> *Id.* 304 F.3d at 1229-30. Emphasis added.

Similarly, in the present case, the bottom line is similar to that in *Elan Pharmaceutical*, which is that the novel product of this invention, which is a longitudinal or perpendicular magnetic recording medium comprising, in this order, a glass or glass-ceramic substrate comprising Li, a sealing layer comprising substantially amorphous NiNb directly deposited on the glass or glass-ceramic substrate; and a magnetic layer *did not previously exist* before this invention. Therefore, a "sealing layer [that] has a thickness of about 450Å or less and substantially prevents migration of Li from the substrate to the magnetic layer of the magnetic recording medium" of the novel product of this invention simply could *not* be "inherent" in any prior art products because the claimed product did *not* previously exist.

The Examiner cites *Spada* for stating, "When the PTO shows a sound basis for believing that the *products of the applicant and the prior art are the same*, the applicant has the burden of

showing that they are not." [Emphasis added.] *Spada* is not inconsistent with *Elan Pharmaceutical* and the Examiner's reading of *Spada* is incorrect. *Spada* states "a sound basis for believing that the *products* of the applicant and the prior art are the same," *not* a product of the applicant and a hypothetical product based on the prior art. The Examiner also cites *Best* and states, "a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art *products* do not necessarily on inherently possess characteristics of claimed products." [Emphasis added.] The Examiner has failed to recognize in reading *Spada* and *Best* that they state that an applicant must show that a prior art product, *not* a hypothetical product, does not necessarily or inherently possess characteristics of a claimed product.

A further clarification on the decision in *Best* is provided below because the Examiner incorrectly relied on *Best* and states the following on page 7, lines 11-19, Action of March 14, 2002:

> [I]t has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

From the Examiner's paraphrasing of the decision in *Best*, it would appear that the Examiner could argue "inherency" for either an anticipation *or* obviousness rejection. The exact language of *Best* (quoted below) indicates that *Best* does *not* stand for the proposition that the Examiner can argue "inherency" for an obviousness rejection.

> Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on "inherency" under 35 USC 102, on "prima facie obviousness" under 35 USC 103, jointly or alternatively, n4/ the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products.
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> *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977)

In the above quote from *Best*, "n4" refers to footnote 4 in *Best*, which states, "There is nothing inconsistent in concurrent rejection for obviousness under 35 USC 103 and for anticipation by inherency under 35 USC 102." *Id.* In both the quote above from *Best* and footnote 4, the court in *Best* refers to "inherency under 35 USC 102" and clearly distinguishes it from "obviousness under 35 USC 103." This point that an Examiner *cannot* support an obviousness rejection based on "inherency" is also the position adopted by the Federal Circuit in *In re Rijckaert*, 9 F.2d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). "Obviousness cannot be predicated on what is not known at the time of an invention is made, even if the inherency of a certain feature is later established." *Id.*

Furthermore, the facts in *Best* provide further support that the court in *Best* did not suggest that an Examiner could argue obviousness by combining two references and arguing that a missing descriptive matter from the claim is "inherent" in a hypothetical product that is a figment of the Examiner's imagination, as is the situation in this case. In *Best*, "Product claims 1-2 were rejected as unpatentable over *each of* Hansford, Maher, McDaniel, Kerr I, and Kerr II." *Best*, 562 F.2d at 1255; emphasis added. The court only considered Hansford and states the following:

> In product claim 1 appellants have "fingerprinted" their crystalline zeolitic aluminosilicate by reciting six parameters, two directly compositional in nature, SiO2/Al2O3 and Na2O/Al2O3 molar ratios. The other parameters are the cubic unit cell size (ao), the ion exchange capacity, the oxygen adsorption capacity, and the X-ray powder diffraction pattern. Hansford discloses SiO2/Al2O3 and Na2O/Al2O3 molar ratios within the ranges recited in claim 1, but does not specifically disclose the other parameters.
>
> Though urging that the other parameters are the unique result of their claimed process, appellants have offered no comparison of those other parameters with the corresponding parameters of Hansford's product.
>
> We affirm the decision of the board upholding the rejections of product claims 1-2 on Hansford and do not reach the rejections of claims 1-2 on Maher, McDaniel, Kerr I, or Kerr II.
>
> *Best*, 562 F.2d at 1255-56.

Therefore, unlike in this case, the court in *Best* was only applying a *single* reference (Hansford) that "discloses SiO2/Al2O3 and Na2O/Al2O3 molar ratios within the ranges recited in claim 1, but does not specifically disclose the other parameters," to support a rejection based on inherency. *Id.* Therefore, all that the applicant in *Best* was required to do to overcome the inherency rejection was to test the *previously existing* product of Hansford for inherent characteristics, but *not* to test a *hypothetical product* postulated by the Examiner as in this case. A careful examination of *Best*, as done above, shows that the decision of *Best* is also consistent with the decision of *Elan Pharmaceutical* that "'[a]nticipation' in the patent sense means that the subject matter was *previously known*." *Elan Pharmaceuticals*, 304 F.3d at 1230.

The decision of *Elan Pharmaceutical* is also consistent with other previous decisions on inherency. For example, in *Titanium Metals Corp. v. Banner,* 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), claims to titanium (Ti) alloy with 0.6-0.9% nickel (Ni) and 0.2-0.4% molybdenum (Mo) were held anticipated by a graph in a Russian article on Ti-Mo-Ni alloys

because the graph contained an actual data point corresponding to a Ti alloy containing 0.25% Mo and 0.75% Ni and this composition was within the claimed range of compositions. This Ti alloy disclosed in the Russian article was *not* a hypothetical product. However, the Russian article did not mention that such an alloy could provide good corrosion resistance. Instead, the inventors in *Titanium Metals* apparently found that this alloy gives desirable properties, particularly corrosion resistance in hot brine solutions, and recited "said alloy being characterized by good corrosion resistance in hot brine solutions." *Id.* The Federal Circuit *Titanium Metals*, however, decided that the property of the alloy was inherent in the Ti alloy disclosed in the Russian article and considered the claimed invention as "patenting an *old alloy*, known to others through a printed publication, by one who has discovered its corrosion resistance." Id.; emphasis added. The *Titanium Metals* decision is consistent with *Elan Pharmaceuticals* that "'[a]nticipation' in the patent sense means that the subject matter was previously known" as a previously existing product (or process), *not* a hypothetical product (or process). *Elan Pharmaceuticals*, 304 F.3d at 1230.

"To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so *recognized* by persons of ordinary skill." *Continental Can Co. USA v. Monsanto Co.,* 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) (emphasis added). Clearly, in order to "make clear that the missing descriptive matter is necessarily present in the thing described in the reference" there must be an *actual previously existing* prior art product, *not* a hypothetical product. Thus, the decision of *Continental Can*, which is cited by *Elan Pharmaceuticals*, 304 F.3d at 1228, is also consistent with the decision of

Elan Pharmaceuticals "new products are not 'anticipated' when they did not previously exist." *Elan Pharmaceuticals*, 304 F.3d at 1230. Applicants respectfully submit that in light of the clarification provided by the Federal Circuit in *Elan Pharmaceuticals*, 304 F.3d at 1230 (decided in August 2002), the Board will correct the Examiner's incorrect application of the law on inherency for an obviousness rejection.

Applicants repeatedly explained to the Examiner during the prosecution of this application that the Examiner's application of the law on inherency is incorrect. See for example, page 3, line 12 to page 6, start of first new paragraph, in the Amendment of April 5, 2002, and the Examiner's response on page 7, line 1 to page 8, line 2, Action of June 12, 2002. Applicants respectfully submit that the following statements of the Examiner from this response show that the Examiner lacks understanding of the law of inherency:

(1) "[H]ad the examiner applied prior art comprising a lithium substrate with a NiNb layer directly deposited therein, it would be under 35 U.S.C. 102, not 35 U.S.C. 103." Page 7, lines 16-18, Action of June 12, 2002. The Examiner believes that because he is combining Taguchi for reciting a lithium-containing substrate and Ross for disclosing a NiNb layer, he has established a *prima facie* case of obviousness by *assuming* that the missing descriptive matter regarding substantially preventing Li migration is necessarily present in the hypothetical combination. This is contrary to the law cited above from *Continental Can.*

(2) "As such, the examiner deems that the closest prior art is Ross et al. ('997) which discloses embodiments of laser textured NiNb layers directly deposited on borosilicate glass substrates and disclose examples wherein NiNb is deposited above a Cr adhesion layer over a borosilicate glass substrate." Page 7, line 2 from the bottom to page 8, line 2, Action of June 12, 2002. This statement goes to show that the Examiner simply does not understand (or ignores to

recognize) that there is no *previously existing* prior art product disclosed in Ross that can be evaluated either for inherent disclosure of substantially preventing Li migration through a NiNb layer directly on a Li-containing substrate or for unexpected results. Ross discloses in column 8, lines 1 and 2 that "NiNb is sputtered directly onto substrate 112 [which is a non-lithium containing borosilicate glass]." Ross does not disclose the thickness of the NiNb layer sputtered directly onto the borosilicate glass. In addition, even if one would evaluate Li migration through a NiNb layer of a certain thickness deposited directly on the borosilicate glass of Ross, then one would find *no* Li migration (obviously!) because the borosilicate glass of Ross contains *no* Li. In short, testing for Li migration on a NiNb layer on the borosilicate glass of Ross would be a meaningless experiment.

The Examiner has also stated, as quoted above, that "the *prime facie* case can be rebutted by ***evidence*** showing that the prior art products do not necessarily process [sic, possess] the characteristics of the claimed product." In this case, as explained above, no "prior art products" existed in which there was a NiNb layer directly onto a Li-containing substrate. Therefore, the Examiner's request to produce "***evidence*** showing that the prior art products do not necessarily process [sic, possess] the characteristics of the claimed product" is totally meaningless. In short, the Examiner is requiring Applicants to compare the properties of a hypothetical "prior art product" in which the NiNb layer is *directly* on a lithium-containing substrate as claimed. This evaluation is only possible by replicating a hypothetical "prior art product" to be the *same* as the claimed product. However, this requirement is impermissible as explained in MPEP 716.02(e) as follows:

> Requiring applicant to compare claimed invention with polymer[7] suggested by the combination of references relied upon in the rejection of the claimed invention under 35 U.S.C. 103 "would be requiring comparison of the results of the invention with the results of the invention." [Citing *In re Chapman*, 357 F.2d 418, 422, 148 USPQ 711, 714 (CCPA 1966).]

3. The Examiner has Incorrectly Construed "a sealing layer" or "a sealing means."

Independent claims 21 and 22 recite "the sealing layer ... substantially prevents the migration of Li" and claim 23 recites "a sealing means ... for substantially preventing migration of Li." On page 2, lines 6-8 from the bottom, of the Advisory of September 27, 2002, the Examiner states:

> [A]pplicants ... merely refer to "substantially preventing the migration of Li". While substantially is not indefinite, it must be given a broad interpretation since the specification does not explicitly state that substantially means "less than 500 counts/minute."

Applicants respectfully submit that the Examiner has not properly read the specification. The first two paragraphs of the "Description of the Invention" on pages 10 and 11 explains:

> The present invention enables the manufacture of magnetic recording media exhibiting low Li migration and suitable for high density longitudinal and perpendicular magnetic recording employing a glass or glass-ceramic substrate having high Li_2O concentrations ... . This objective is achieved in accordance with embodiments of the present invention by strategically forming a sealing layer on the glass or glass-ceramic substrate containing the high Li concentration or by forming a sealing means for substantially preventing the migration of Li from the substrate.
>
> A sealing layer or the sealing means prevents leaching of Li from the substrates. The sealing layer or the sealing means can

[7] In the context of this application, the term "polymer" should be replaced with "a magnetic recording medium."

> function as a seed layer when the layer affects the magnetic properties of the media. A sealing layer or a sealing means is a layer that can reduce Li concentration on the surface of the magnetic media to *less than 500 counts/minute* by the time-of-flight secondary ion mass spectroscopy (TOF-SIMS). [Emphasis added.]

B. The Obviousness-type Double Patenting Rejection Should be Reversed.

Claims 2, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18 and 21-25 were rejected for obviousness-type double patenting over claims 1-20 of Chen '890 in view of Ross. This rejection is respectfully traversed and should be withdrawn for the same reasons that the obviousness rejections over Ross as the primary reference should be withdrawn.

CONCLUSIONS

For the foregoing reasons, Applicants submit that the obviousness rejections and the obviousness-type double patenting rejection should be withdrawn.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952,** referencing docket number 146712000400.

Respectfully submitted,

Dated: January 14, 2003 By: _____

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APPENDIX 1

2. The magnetic medium according to claim 21, further comprising:

an underlayer between the sealing layer and the magnetic layer; and

a protective overcoat on the magnetic layer,

wherein the substrate comprises about 0.5 to about 32 wt.% lithium oxide (Li_2O).

3. The magnetic recording medium according to claim 21, wherein the surface of the sealing layer is oxidized.

8. The magnetic recording medium according to claim 21, wherein the NiNb sealing layer further comprises about 0.1 wt.% to about 5 wt.% of a material selected from the group consisting of boron, tungsten, tantalum, zirconium and phosphorus.

9. The magnetic recording medium to claim 21, further comprising a chromium-vanadium underlayer on the sealing layer, wherein the magnetic layer comprises an alloy of Co, Cr, Pt and Ta.

11. The method according to claim 22, further comprising:

sputter depositing an underlayer on the sealing layer prior to said sputter depositing the magnetic layer; and

sputter depositing a protective overcoat on the magnetic layer,

wherein the substrate comprises about 0.5 to about 32 wt.% lithium oxide (Li_2O).

12. The method according to claim 22, further comprising oxidizing the surface of the sealing layer.

17. The method according to claim 22, wherein the amorphous NiNb sealing layer further comprises about 0.1 wt.% to about 5 wt.% of a material selected from the group consisting of boron, tungsten, tantalum, zirconium and phosphorus

18. The method according to claim 22, comprising sputter depositing the sealing layer using a target comprising at least 12 wt.% Nb.

21. A longitudinal or perpendicular magnetic recording medium comprising, in this order:

a glass or glass-ceramic substrate comprising Li;

a sealing layer comprising substantially amorphous NiNb directly deposited on the glass or glass-ceramic substrate; and

a magnetic layer,

wherein the sealing layer has a thickness of about 450Å or less and substantially prevents migration of Li from the substrate to the magnetic layer of the magnetic recording medium.

22. A method of manufacturing a longitudinal or perpendicular magnetic recording medium, the method comprising:

sputter depositing a sealing layer comprising substantially amorphous NiNb directly on a glass or glass-ceramic substrate comprising Li; and

sputter depositing a magnetic layer on the sealing layer;

wherein the sealing layer has a thickness of about 450Å or less and substantially prevents migration of Li from the substrate to the magnetic layer of the magnetic recording medium.

23. A longitudinal or perpendicular magnetic recording medium comprising, in this order:

a glass or glass-ceramic substrate comprising Li;

a sealing means comprising NiNb directly on the substrate having a thickness of about 450Å or less for substantially preventing migration of Li from the substrate to a magnetic layer of the magnetic recording medium; and

the magnetic layer.

24. The magnetic medium according to claim 21, wherein the substrate comprises about 10.5 to about 32 wt.% lithium oxide (Li_2O).

25. The method of claim 22, wherein the substrate comprises about 10.5 to about 32 wt.% lithium oxide (Li_2O).